

Answer all question

1 - For the reaction $X \rightarrow Y$, the following data were obtained.

Time, min	[X], M	Time, min	[X], M
0	0.500	60	0.240
10	0.443	70	0.212
20	0.395	80	0.190
30	0.348	90	0.171
40	0.310	100	0.164
50	0.274		

- Make appropriate plots or perform linear regression using these data to determine the reaction order.
 - Determine the rate constant for the reaction.
 - Using the rate law you have determined, calculate the half-life for the reaction.
 - Calculate how long it will take for the concentration of X to be 0.330 M.
- 2 - discuss the effect of temperature on the rate of reaction , and how to determine activation energy of reaction
- 3 - What is the potential of the electrode $\text{Pt}/\text{Fe}^{2+} (0.1\text{M}), \text{Fe}^{3+} (0.01\text{M})$, The value of $E^0 \text{Fe}^{3+}/\text{Fe}^{2+}$ is +0.771 v at 25°C
- 4- Discuss how to measure E M F of A cell , and discuss with draw component of standard Weston cell .

With my best wishes

Dr / Essam El- Melegy

Course title: chem. 341

Date: 6/1/2016

Time allowed: 1 hour

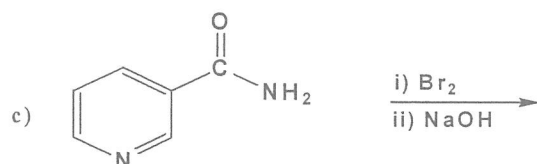
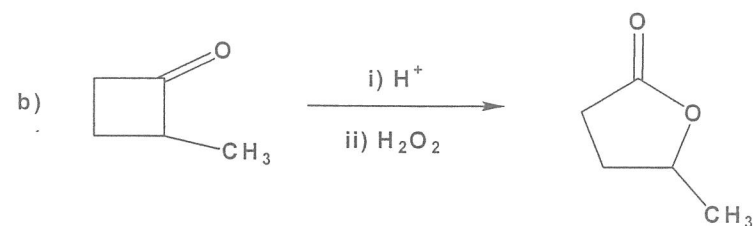
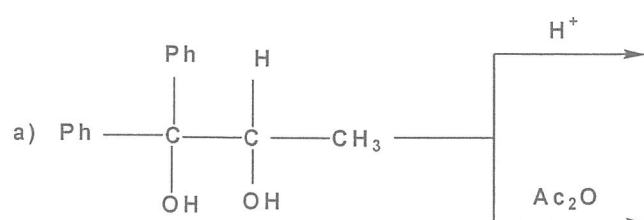
Marks: (70 marks)

Level: 3rd, autumn term.

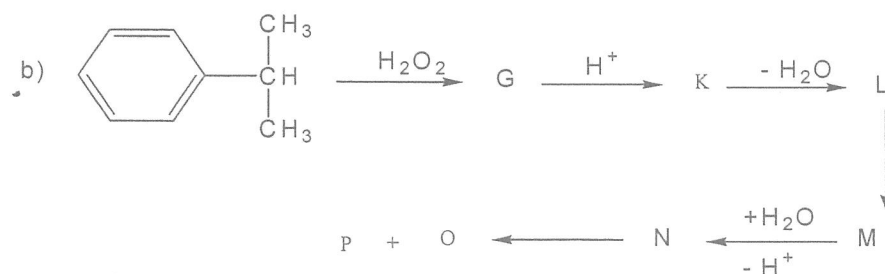
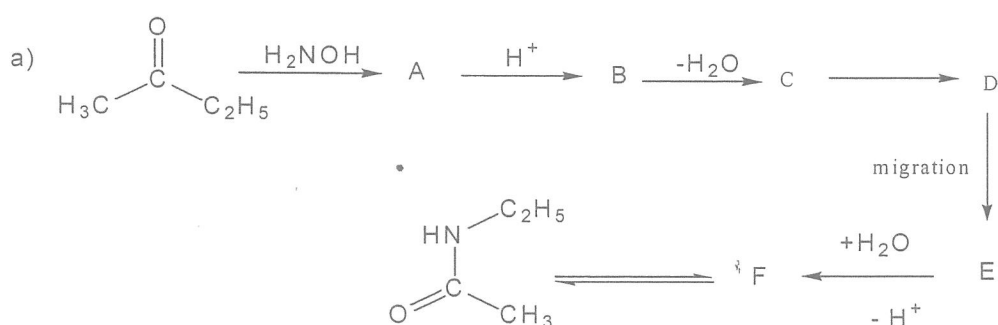
Groups: major chemistry

Professor name: Dr/El-sayed Abdelrehim

I) Suggested the mechanisms of the following reactions:- (40 marks).



II) Complete the following:- (30 marks)





Damanshour University
Faculty of Science
Chemistry Department



Program	Surface and catalysis chemistry	Time	1 hour
Course Code	C356	Total marks	70
Date	2 nd Semester, 01- 06- 2016	Examiner	Dr./ Gaber Hashem
Read the questions well then shade the correct answer in the following answer table			

Answer Table

Question No.	Answer				Question No.	Answer			
1	A	B	C	D	19	A	B	C	D
2	A	B	C	D	20	A	B	C	D
3	A	B	C	D	21	A	B	C	D
4	A	B	C	D	22	A	B	C	D
5	A	B	C	D	23	A	B	C	D
6	A	B	C	D	24	A	B	C	D
7	A	B	C	D	25	A	B	C	D
8	A	B	C	D	26	A	B	C	D
9	A	B	C	D	27	A	B	C	D
10	A	B	C	D	28	A	B	C	D
11	A	B	C	D	29	A	B	C	D
12	A	B	C	D	30	A	B	C	D
13	A	B	C	D	31	A	B	C	D
14	A	B	C	D	32	A	B	C	D
15	A	B	C	D	33	A	B	C	D
16	A	B	C	D	34	A	B	C	D
17	A	B	C	D	35	A	B	C	D
18	A	B	C	D	36	A	B	C	D
Examiner: Dr./Gaber Hashem Gaber Ahmed Signature:					The Mark:				

الرقم السري:

الرقم السري:

اسم الطالب:

رقم الجلوس:

الفرقة:

الشعبة:



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Course Code	C356	Total marks	70
Date	2 nd semester, 01- 06- 2016	Examiner	Dr./ Gaber Hashem
Read the questions well then shade the correct answer in the answer table			

- 1- The force in dyne acting on the surface at right angles to any line if 1 Cm length is called.....
- (A) Surface energy
(B) Surface tension
(C) Adsorption
(D) None
- 2-could be used to determine the value of surface tension.
- (A) $\frac{1}{2} P r$
(B) $\frac{1}{2} h g d r \cos \theta$
(C) $\frac{\Delta h}{\left(\frac{2}{d g}\right)\left(\frac{1}{r_1}-\frac{1}{r_2}\right)}$
(D) All
- 3- Which of the following is CORRECT when adhesion forces are greater than the cohesive forces.
- (A) the liquid wet the glass and raise in the capillary tube
(B) The liquid doesn't wet the glass and down in the capillary tube
(C) the liquid doesn't wet the glass and raise in the capillary tube
(D) the liquid wet the glass and down in the capillary tube
- 4- Which is INCORRECT statement about adding ionic salt to liquid.
- (A) The dissolved ions tend to pull the surface liquid molecules into the interior of the solution.
(B) The surface layers will be poorer in solute than the bulk of the solution
(C) The solute is negatively adsorbed on the surface
(D) The surface tension of the liquid decreases

- 5- The relation between surface tension and temperature could be obtained as.....
- (A) $\gamma(MV)^{1/2} = a-KT$
 - (B) $\gamma(MV)^{3/2} = a-KT$
 - (C) $\gamma(MV)^{2/3} = a-KT$
 - (D) $\gamma(MV) = a-(KT)^{1/2}$
- 7- The surface tension of H_2O will.....by adding KNO_3 which isadsorbed on water surface
- (A) Increase - Negatively
 - (B) Increase - Positively
 - (C) Decrease - Negatively
 - (D) Decrease - Positively
- 9- Which is INCORRECT about surfactants
- (A) They called surface active agents
 - (B) Always increase the surface tension of liquids
 - (C) Consists of polar hydrophilic head and non-polar hydrophobic tail
 - (D) Can be classified into anionic, cationic, non-ionic, and amphoteric
- 11- Which of the following factors increase will lead to decrease of surface tension of alcohols.
- (A) Temperature
 - (B) Concentration
 - (C) Chain length
 - (D) All
- 6- The strong adsorption of surfactants at surfaces or interfaces in the form of an oriented monolayer is called....
- (A) surface tension
 - (B) surface activity
 - (C) chemisorption
 - (D) physical adsorption
- 8- The surface tension of H_2O will.....by adding soap which isadsorbed on water surface
- (A) Increase - Negatively
 - (B) Increase - Positively
 - (C) Decrease - Negatively
 - (D) Decrease - Positively
- 10- The surface tension of liquid Hg in contact with air at $15^\circ C$ equals 487 dyne/Cm . the surface pressure in a capillary tube of diameter (1mm) immersed in Hg will be....
- (A) 19480 dyne/Cm^2
 - (B) 38960 dyne/Cm^2
 - (C) 9740 dyne/Cm^2
 - (D) 1948 dyne/Cm^2
- 12- What is the height of H_2O inside a capillary tube of a radius 0.002 m . density of H_2O is 996 Kg/m^3 and its surface tension= $71.18 \times 10^{-3} \text{ N/m}$. $g = 9.81 \text{ m/s}^2$
- (A) 0.73 Cm
 - (B) 7.3 Cm
 - (C) 0.365 Cm
 - (D) 3.65 Cm

13- Which is CORRECT about chemisorption:

- (A) Gas molecules are held to the surface by van der waal's forces
- (B) Low amount of heat are released by adsorption
- (C) Reversible process
- (D) Only monolayer could be formed selectively

15- A porous solid that has a pore size of 10 nm is classifies as

- (A) Micro-porous
- (B) Meso-porous
- (C) Macro-porous
- (D) None

17- Adsorption is always.....

- (A) Endothermic
- (B) Exothermic
- (C) Selective
- (D) All

14- Which is INCORRECT about Langmuir adsorption isotherm:

- (A) At the maximum adsorption, only monolayer is formed
- (B) The surface of the adsorbent is uniform, the rate of adsorption= the rate of desorption
- (C) The heat of adsorption doesn't depend on the amount of adsorbate gas
- (D) Physical adsorption take place on non-porous solid

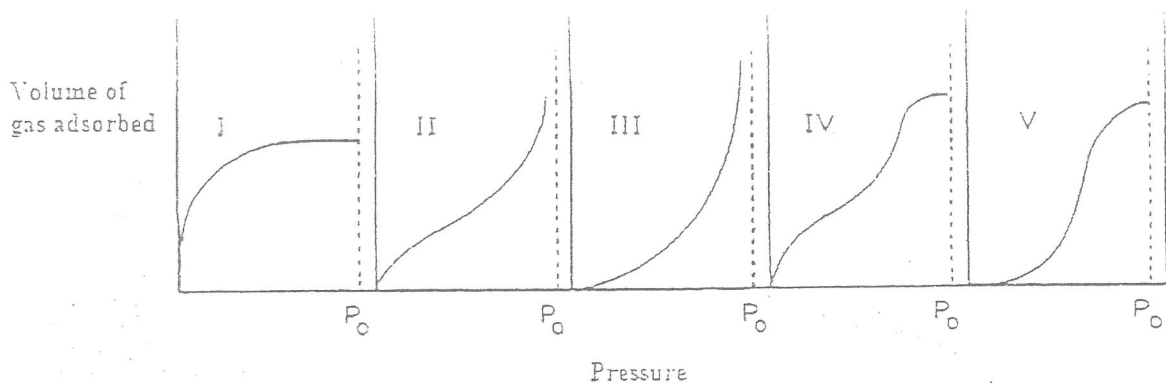
16-is the tendency of solids or liquids to attract gases or other substances to satisfy their residual forces

- (A) Absorption
- (B) Adsorption
- (C) Surface free energy
- (D) Surface tension

18- The amount of adsorbate gas decrease by increase.....

- (A) Temperature
- (B) Surface area of adsorbent
- (C) Pressure of gas
- (D) All

The following figure related to questions 19-21



- 19-.....isotherms are obtained in case of physical adsorption on non-porous solid
- (A) I & II
(B) II & III
(C) III & IV
(D) IV & V
- 20-.....only is obtained in case of chemisorption
- (A) I
(B) II
(C) III
(D) IV
- 21-.....isotherms are obtained in case of physical adsorption on porous solid
- (A) I & III
(B) III & IV
(C) IV & V
(D) I & IV
- 22- The BET equation is
- (A) $\frac{P}{V(P^0-P)} = \frac{1}{CV_m} + \frac{C-1}{CV_m P^0}$
(B) $\frac{V}{P(P^0-P)} = \frac{1}{V_m} + \frac{C-1}{CV_m P}$
(C) $\frac{P}{V(P^0-P)} = \frac{1}{C} + \frac{C-1}{V_m P^0}$
(D) $\frac{P}{V(P^0-P)} = \frac{1}{CV_m} + \frac{C-1}{V_m P^0}$
- 23- Which is INCORRECT in BET equation:
- (A) V_m is the volume of the monolayer of the gas
(B) Surface area of the solid could be determined from V_m
(C) $V_m = \frac{1}{\text{slope} + \text{intercept}}$
(D) $C = e^{\frac{\Delta H_L - \Delta H_i}{RT}}$, and its value represent the surface area of the adsorbent
- 24- Freundlich adsorption isotherm could be used to study the adsorption from solutions as follow:
- (A) $\frac{x}{m} = KC^n$
(B) $\log \frac{x}{m} = \log K + \frac{1}{n} \log C$
(C) $x = KC^n$
(D) None

25- Which of the following differentiate heterogeneous catalysis about homogenous catalysis:

- (A) Reactants and catalyst have different physical state
- (B) Reactions are took place on the catalyst's surface
- (C) The catalyst can be separated easily
- (D) All

27- Photocatalyst can be effective by the action of.....

- (A) Heat
- (B) Electricity
- (C) Light
- (D) Magnetism

29- Which is INCORRECT about catalyst:

- (A) Substance that increases the rate of the reaction by providing an alternative reaction mechanism
- (B) Can recovered unchanged chemically by the end of the reaction
- (C) Change the equilibrium position
- (D) Lower the activation energy

31- $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$, by adding Ni as a catalyst, which of the following is INCORRECT:

- (A) The rate of ammonia formation increases
- (B) The equilibrium constant of the reaction increases
- (C) Dynamic equilibrium stayed unchanged
- (D) All

26- Which of the following is a fact about catalyzed reaction:

- (A) The reaction activation energy is altered
- (B) The formed intermediates are different from those formed in non-catalytic reactions
- (C) The rate of the reaction is changed
- (D) All

28- In the reaction, $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \rightarrow \text{H}_2\text{Cl}_2 \rightarrow 2\text{HCl}$, H_2Cl_2 is called.....

- (A) Intermediate
- (B) Transition state
- (C) Product
- (D) None

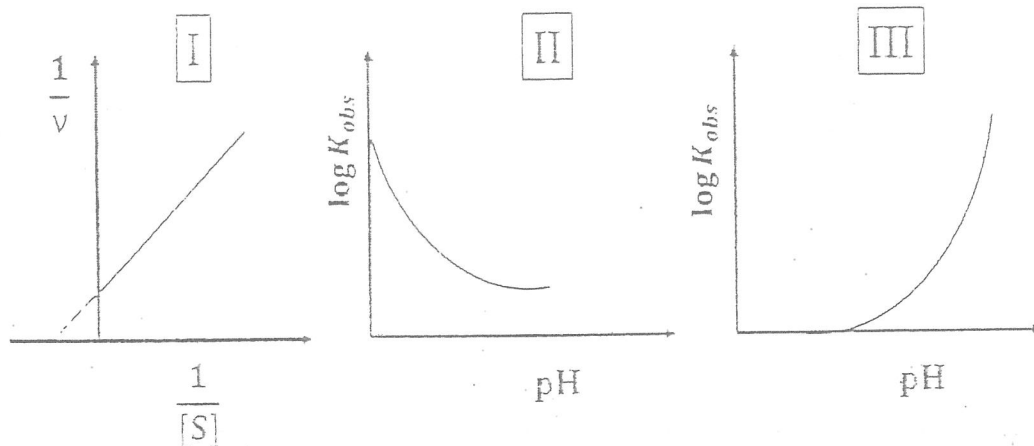
30- Which of the following is NOT a property of catalyst:

- (A) Catalysts are usually specific
- (B) Catalyst undergo physical change during reaction
- (C) Catalyst increases the rate of the reaction
- (D) Small amounts of catalyst is needed to change the rate of the reaction indefinitely

32- A measure of the catalyst's ability to direct the conversion to the desired products is its.....

- (A) Selectivity
- (B) Activity
- (C) Poisoning
- (D) Homogeneity

The following figure related to questions 33-35



33- Which figure describes specific base catalysis:

- (A) I
- (B) II
- (C) III
- (D) None

34- Which figure represent Michaelis-Menton plot for enzyme catalysis

- (A) I
- (B) II
- (C) III
- (D) None

35- Specific acid catalysis diagram is.....

- (A) I
- (B) II
- (C) III
- (D) None



Choose the correct answer:

- 1) Each α -particle has the mass:
 - a) Equal to that of hydrogen.
 - b) Nearly four times that of hydrogen atom.
 - c) Half of the hydrogen atom.
 - d) None of these.
- 2) Which among the following has the highest penetrating power?
 - a) γ - rays
 - b) β - rays
 - c) α - rays
 - d) cathode rays
- 3) Atoms of different elements containing the same number of neutrons but different number of total nucleons is known as:
 - a) Isotones
 - b) Isodiaphers
 - c) Isotopes
 - d) Isosterism
- 4) The radius of the nucleus of any atom is related to its mass number according to the relation:
 - a) $r = R_0 A$
 - b) $r = \frac{1}{2} R_0 A$
 - c) $r = R_0 A^{\frac{1}{2}}$
 - d) $r = R_0 A^{\frac{1}{3}}$
- 5) When a β -particle is emitted, the new element formed is displaced position to the right in the periodic table than that of the parent element.
 - a) one
 - b) two
 - c) four
 - d) None of these.
- 6) When positron is emitted by a radioactive nucleus then:
 - a) Atomic number remains the same.
 - b) Atomic number increases by 1 unit.
 - c) Atomic number decreases by 1 unit.
 - d) Atomic number increases by 2 units.
- 7) Which among the following is a false statement?
 - a) The projectile should have light weight.
 - b) The projectile should have low velocity.
 - c) Both a and b
 - d) None of these.
- 8) The velocity of α -rays is found in the range of:
 - a) 1/10th to 1/20th of that of light.
 - b) 1/20th to 1/30th of that of light.
 - c) 1/5th to 1/10th of that of light.
 - d) Both a and c.
- 9) Mark the incorrect statement about nuclear fusion?
 - a) Material used is D^2 , T^3 .
 - b) Percent efficiency is high.
 - c) It can be controlled.
 - d) It is not a chain process.
- 10) The half-life period of $_{53}^{125}I$ is 60 days. Find the percent of the original radioactive present after 180 days.
 - a) 11%
 - b) 12.5%
 - c) 13.5%
 - d) 10.5%
- 11) Find the rate of disintegration of 0.001g of a sample of Ra^{226} if half-life period is 1620 years.
 - a) 4.28×10^{-8} g per year.
 - b) 4.28×10^{-7} g per year.
 - c) 3.28×10^{-8} g per year.
 - d) 3.28×10^{-7} g per year.
- 12) The total charges before and after the reaction is conserved. This relation is given by:
 - a) Law of conservation of mass number.
 - b) Law of conservation of atomic number.
 - c) Law of conservation of mass and energy.
 - d) None of these.
- number.
- 13) The unit of radioactivity is:
 - a) Rutherford.
 - b) Becquerel
 - c) Curie
 - d) All of these.
- 14) Alpha-particles cannot pass through thick sheets of metals because:
 - a) They are heavy particles.
 - b) They have low penetrating power.
 - c) They have high penetrating power.
 - d) Both a and b.

15) Which among the following is a false statement about artificial radioactivity?

- a) It is a non-spontaneous process.
- b) Less amount of energy is evolved.
- c) Projectiles are not required.
- d) It can be controlled.

16) Find the age of wood, if an old piece of wood has 25.6% as much C^{14} as ordinary wood today has. Half-life period of C^{14} is 5760 years.

- a) 11329 years.
- b) 11275 years.
- c) 11289 years.
- d) 11212 years.

17) The role of heavy water in a nuclear reactor is:

- a) As a moderator.
- b) As a coolant.
- c) Both a and b
- d) None of these.

18) Nuclear fusion takes place at:

- a) Low temperature.
- b) Moderate temperature.
- c) Very high temperature.
- d) Both a and b is possible.

19) An alpha- particle is emitted from the atom of ${}_{92}U^{238}$. What is the number of neutrons left in the atom?

- a) 140
- b) 144
- c) 150
- d) 156

20) Artificial transmutation can be carried out by particles such as:

- a) Protons
- b) Deutrons
- c) Neutrons
- d) All of these.

21) Co^{60} is used in the treatment of:

- a) Pneumonia
- b) Leukaemia
- c) Cancer
- d) All of these

22) Which isotope is used for dating archeological finding?

- a) ${}_{92}U^{235}$
- b) ${}_1H^3$
- c) ${}_8O^{18}$
- d) ${}_6C^{14}$

23) Particle is used to bombard ${}_{13}Al^{27}$ to give ${}_{15}P^{30}$ and a neutron.

- a) Neutron.
- b) Proton.
- c) α -particle
- d) β -particle.

24)does not contain material particles.

- a) α - rays.
- b) β - rays.
- c) γ - rays.
- d) Anode rays.

25) Which one of the following is used as neutron absorber in the nuclear reactor?

- a) Cadmium
- b) Deuterium.
- c) Water.
- d) All of these.

26) A radioactive isotope decays at such a rate that after 96 mins only $1/8$ th of the original amount remains. The value of $t_{1/2}$ of this nuclide is:

- a) 48 min
- b) 25 min
- c) 12 min
- d) 32 min.

27) Which among the following is a positron?

- a) ${}_{+1}e^0$
- b) ${}_1H^1$
- c) ${}_{-1}e^0$
- d) None of these.

28) Among the following, which Uranium is the most reactive?

- a) ${}^{248}U$
- b) ${}^{226}U$
- c) ${}^{235}U$
- d) ${}^{238}U$

29)are the best bombarding particles.

- a) Protons
- b) Electrons
- c) Positrons
- d) Neutrons

30) Relation between mass defect and binding energy is given by:

- a) B.E. = $\Delta m \times 931 - M$.
- b) B.E. = $\Delta m + 931$.
- c) B.E. = $\Delta m \times 931$.
- d) B.E. = $[m + (A-Z) mn] - M$

Good Luck

Course title: chem.446

Date: 5/6/2015.

Time allowed: 2 hour

Marks :(70 marks)

Level: 4th, spring term.

Groups: major chemistry

Professor name: dr/El-sayedAbdelrehim.

D) Answer the following:-

- Derive Hammett equation and define each term.
- Explain Hammett equation is not applied on aliphatic compounds or ortho substituted benzoic acid?
- Using the following σ values for substituted benzoic acid.

substituent	σ_{meta}	σ_{para}
OCO-CH ₃	0.39	0.31
OCF ₃	0.40	0.35
NO ₂	0.71	0.78

Discuss and explain the inductive and resonance effects. Show the resonance forms.

- Estimate the p^{ka} of the conjugated acid of 3, 4-dimethylaniline, taken that ρ and p^{kaH} of the conjugated acid of 3, 4-dimethylaniline, are 2.89 and 4.63 respectively, while σ_{meta} and σ_{para} of CH₃ are 0.07 and 0.17 respectively.

e) Draw the chemical structures of the following:-

- bicyclo[4.4.0]decane.
- spiro[4.5]decane.
- bicyclo[2.2.1]hept-1(2)-ene.

f) Draw all possible conformers of the following:-

- trans 1,2-dichlorocyclohexane.
- cis 1,3-dimethylcyclohexane.

II) Answer the following:-

a) Write the type of UV electronic transition for each of the following:-

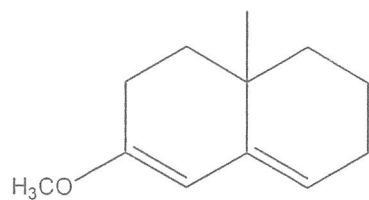
i) Propanoic acid

ii) Toluene

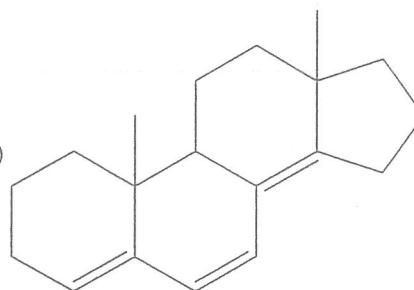
iii) Isobutane

b) Calculate the theoretical λ_{max} for the following compounds:-

a)



b)



Answer the following Questions:

Question No1.

- A. Discuss the chemistry of the different production methods of the Iron and Steel*
- B. different elements is added to Iron to produce new steel alloys such as stainless steel or carbon steel ...etc, discuss this statement in view of your study of inorganic industrial chemistry course.*

Question No2.

- (A) Discuss the chemistry of Cement production.*
- (B) Write a brief on the polymers additives to Portland Cement in order to improve its chemical properties to meet different engineering and environmental requirements.*

BEST WISHES

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